

### **REMARKS/ARGUMENTS**

In the Office Action mailed on 29 August 2006, the Examiner rejected claims 1-3, 5-7, 9, 13, 21, 22, and 26 under 35 USC 103(a) over Takakado US5237260 in view of Johnson US5852558 and Glennon US4507724; rejected claim 4 under 35 USC 103(a) on Takakado, Johnson, and Glennon, and further in view of Lakey US4883973; rejected claim 14 under 35 USC 103(a) on Takakado, Johnson, and Glennon, and further in view of Geis US5903116; rejected claims 10, 12, and 23 under 35 USC 103(a) on Takakado, Johnson, and Glennon and further in view of Stanton US4179729; rejected claims 8 and 15 under 35 USC 103 (a) on Takakado, Johnson, and Glennon and further in view of Nguyen US6067237; and rejected claims 11 and 24 under 35 USC 103(a) on Takakado, Johnson, and Glennon and further in view of ordinary skill in art.

On 3 October 2006, inventor Luis Garces and Applicant's representative Ann Agosti had a telephone interview with the Examiner wherein Applicant expressed many of the statements included below (except for pointing out that the inverter in Takakado is single phase) and explained the benefits of the inductor enabling flexibility for expanding the peak value of the average line to neutral value by about fifteen percent. The Examiner maintained the rejection and suggested it would be useful to include the "reason why the inductor is important" in the claims. Applicant has reviewed the Application, cited art, and suggested references and is of the opinion that the subject matter of Applicant's claims, particularly as amended, is not taught or suggested by any combination of the cited art.

Claims 1-15, 21-24, and 25 remain under consideration in the present application. Applicant respectfully requests reconsideration.

Applicant continues to traverse the rejection of claims 1-3, 5-7,9, 13, 21, 22, and 26 under 35 USC 103(a) over Takakado, Johnson, and Glennon and respectfully submits that **Takakado does not describe an inductor coupling a leg of a multi-phase, multi-leg inverter to a neutral output**. However, in an attempt to expedite prosecution and in response to the interview, Applicant has added a clause regarding the coupling of the DC power bus. Each of the independent claims has a corresponding recitation.

1. A motor/generator power conditioner, comprising:  
a rectifier electrically coupled directly to a motor/generator port;  
a ***multi-phase, multi-leg inverter*** electrically coupled to the rectifier and to a load port,  
wherein in a startup mode, the rectifier reverses role and functions as an inverter to provide startup power to the motor/generator port,  
wherein in an operational mode, the combined rectifier and inverter provide generated power to the load port and generates a neutral output ; and  
***an inductor electrically coupling one of the legs of the inverter to the neutral output;***

and

a DC power bus electrically coupling the rectifier to the inverter, **wherein the DC power bus is not coupled to the inductor or to the neutral output.**

21. A motor/generator power conditioner, comprising:  
a three-leg active rectifier electrically coupled directly to a motor/generator port;  
a ***multi-phase, four-leg inverter*** electrically coupled to a load port;  
a bi-directional DC power bus electrically coupling the rectifier to the inverter; and  
a ***neutral output coupled to one of the legs of the inverter through an inductor*** and such as to configure the motor/generator power conditioner so that the three-leg active rectifier can function as an inverter during a startup mode wherein the generator is operated as a motor to accelerate the motor of the motor/generator up to an operational speed **and wherein the DC power bus is not coupled to the inductor or to the neutral output.**

The Office action did correctly indicate that Takakado “does not disclose explicitly showing the inverter having a neutral output,” and again cited both Johnson and Glennon with respect to the neutral output.

With respect to Takakado, in addition to failing to show the inverter having a neutral output, although the rectifier 1 in Takakado appears to be multi-phase, the inverter 2 appears to comprise a single phase inverter (DC-to-single phase AC – see column 1, lines 35-42 which describes inverter 2 and load terminals T01 and T02). Thus Takakado also does not show a multi-phase inverter coupled to a load port.

With regard to Glennon, which does describe a three-phase inverter, Applicant submits that Glennon does not describe an inductor coupling an inverter to a neutral output. Also, because Takakado relates to a single phase inverter, it is unclear to Applicant how one of ordinary skill in the art would have been motivated to look to Glennon to add an extra leg coupled to a neutral line to Takakado. Further, in Glennon, the dc bus filter 14 appears to be coupled to the neutral line 30.

With regard to Johnson, Applicant traverses the Office Action characterization of Johnson. The Office Action states:

... Johnson, Jr. teaches for the purpose of reducing step voltage changes, which affect the performance of loads that it is known for a device 400, use for outputting ac and dc voltages, having a plurality of legs that one of the legs (leg 430) is connected to a neutral output N through inductor  $L_3$  (see figure 4).

However, Applicant submits that Johnson does not describe a multi-leg inverter but instead **Johnson relates to a one leg inverter 420**. Johnson describes element 410 as a first switching circuit operated as a rectifier, element 420 as a second switching circuit which is operated as an inverter, and a third switching circuit 430 operated as a balancer (column 5, lines 46-65). In Johnson, the **balancer (not the inverter) is coupled to the neutral through inductor  $L_3$** . Additionally, although Johnson references step voltage as being a problem in the background

section (column 2), Johnson does not appear to teach that it is the coupling and/or the manner of coupling of the balancer 430 or the single leg inverter 420 to the neutral which is the solution.

The Office Action Response to Arguments on Johnson states:

Johnson, Jr. discloses clearly a device 400, which has several components 410, 420, 430 (column 4, lines 59 —64). Anyone with ordinary skill in the art would know that an electrical device is made of several components. It is further disclosed that component 430 is also a switching device, which is used in combination with the other switches (column 8, lines 15-17, 23-28). It is further disclosed that the load, inductor  $L_3$  and voltage affect the switching devices 431, 432 (column 14, lines 13-17). Clearly, leg 430 is a component of the electronic device 400 for converting voltage and clearly, leg 430 is connected to a neutral output "N" through inductor  $L_3$ .

Applicant submits that, although the components of Johnson together form power converter 400 and may be described as a "device," as discussed above, the components do not collectively form a **multi-phase** inverter. Instead, they are different circuits of the power converter 400 with one of them 420 appearing to operate as a single phase inverter. Again the motivation to combine them is not clear. For example, it is not at all clear that the alleged step voltage affects of the unique power converter device (with rectifier leg, inverter leg, and balancing leg) of Johnson would be applicable in the single-phase inverter of Takakado or the multi-phase inverter of Glennon.

The inductor coupling a leg of a multi-phase, multi-leg inverter to a neutral output and the DC power bus not being coupled to the inductor or to the neutral output are recitations of independent claims 1 and 21 that cannot be ignored and that offer at least one technical advantage. Without the inductor, the maximum peak value of the average line to neutral voltage of the inverter is limited to a value of the DC link voltage divided by two. By adding an impedance via the inductor to couple one of the legs of the inverter to the neutral, flexibility is provided for expanding the peak value of the average line to neutral value by about fifteen percent. This flexibility provides the potential for more control of the inverter's output voltage, and such control is particularly useful in situations wherein the DC link voltage does not have a steady amplitude and/or in situations where overloads or over-voltage conditions occur in a grid-connected system.

Therefore, because none of the three references teaches or suggests, either in combination or individually, the recitations of independent claims 1 and 21, Applicant respectfully submits that, even if the three references were combined, a prima facie case of obviousness is not present for claims 1 and 21 or for dependent claims 2-3, 5-7, 9, 13, 22, and 26 which each depend from one of the aforementioned independent claims 1 and 21.

The remaining dependent claims 4, 8, 10-12, 14-15, and 23-24 were each rejected under 35 USC 103(a) on Takakado, Johnson, and Glennon in view of other references directed to aspects other than the neutral output and do not teach or suggest the inductor coupling a leg of a multi-phase, multi-leg inverter to a neutral output and the DC power bus not being coupled to the

inductor or to the neutral output. Thus, claims 4, 8, 10-12, 14-15, and 23-24 are likewise believed to be in condition for allowance regardless of whether the other references describe the other aspects.

In Summary, Applicant respectfully requests that a timely Notice of Allowance be issued in this case. Should the Examiner believe that anything further is needed to place the application in even better condition for allowance, the Examiner is requested to contact applicant's undersigned representative at the telephone number below.

Respectfully submitted,

By /Ann M. Agosti/  
Ann M. Agosti  
Reg. No. 37,372  
General Electric Company  
Building K1, Room 3A66  
One Research Circle  
Niskayuna, New York 12309  
Telephone: (518) 387-7713